2 BENEFICIAL USES

INTRODUCTION

State policy for water quality control in California is directed toward achieving the highest water quality consistent with maximum benefit to the people of the state. Aquatic ecosystems and underground aquifers provide many different benefits to the people of the state. The beneficial uses described in detail in this chapter define the resources, services, and qualities of these aquatic systems that are the ultimate goals of protecting and achieving high water quality. The Regional Board is charged with protecting all these uses from pollution and nuisance that may occur as a result of waste discharges in the region. Beneficial uses of surface waters, groundwaters, marshes, and mudflats presented here serve as a basis for establishing water quality objectives and discharge prohibitions to attain this goal.

DEFINITIONS OF BENEFICIAL USES

The following definitions (in *italic*) for beneficial uses are applicable throughout the entire state. A brief description of the most important water quality requirements for each beneficial use follows each definition (in alphabetical order by abbreviation).

(AGR) AGRICULTURAL SUPPLY

Uses of water for farming, horticulture, or ranching, including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.

The criteria discussed under municipal and domestic water supply (MUN) also effectively protect farmstead uses. To establish water quality criteria for livestock water supply, the Regional Board must consider the relationship of water to the total diet, including water freely drunk, moisture content of feed, and interactions between irrigation water quality and feed quality. The University of California Cooperative Extension has developed threshold and limiting concentrations for livestock and irrigation water.

Continued irrigation often leads to one or more of four types of hazards related to water quality and the nature of soils and crops. These hazards are (1) soluble salt accumulations, (2) chemical changes in the soil, (3) toxicity to crops, and (4) potential disease transmission to humans through reclaimed water use. Irrigation water classification systems, arable soil classification systems, and public health criteria related to reuse of wastewater have been developed with consideration given to these hazards.

(ASBS) AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE

Areas designated by the State Water Resources Control Board.

These include marine life refuges, ecological reserves, and designated areas where the preservation and enhancement of natural resources requires special protection. In these areas, alteration of natural water quality is undesirable. The areas that have been designated as ASBS in this region are depicted in Figure 2-1. The State Ocean Plan (see Chapter 5) requires wastes to be discharged at a sufficient distance from these areas to assure maintenance of natural water quality conditions.

(COLD) COLD FRESHWATER HABITAT

Uses of water that support cold water ecosystems, including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

Cold freshwater habitats generally support trout and may support the anadromous salmon and steelhead fisheries as well. Cold water habitats are commonly well-oxygenated. Life within these waters is relatively intolerant to environmental stresses. Often, soft waters feed cold water habitats. These waters render fish more susceptible to toxic metals, such as copper, because of their lower buffering capacity.

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(COMM) OCEAN, COMMERCIAL, AND SPORT FISHING

Uses of water for commercial or recreational collection of fish, shellfish, or other organisms in oceans, bays, and estuaries, including, but not limited to, uses involving organisms intended for human consumption or bait purposes.

To maintain ocean fishing, the aquatic life habitats where fish reproduce and seek their food must be protected. Habitat protection is under descriptions of other beneficial uses.

(EST) ESTUARINE HABITAT

Uses of water that support estuarine ecosystems, including, but not limited to, preservation or enhancement of estuarine habitats, vegetation, fish, shellfish, or wildlife (e.g., estuarine mammals, waterfowl, shorebirds), and the propagation, sustenance, and migration of estuarine organisms.

Estuarine habitat provides an essential and unique habitat that serves to acclimate anadromous fishes (salmon, striped bass) migrating into fresh or marine water conditions. The protection of estuarine habitat is contingent upon (1) the maintenance of adequate Delta outflow to provide mixing and salinity control; and (2) provisions to protect wildlife habitat associated with marshlands and the Bay periphery (i.e., prevention of fill activities). Estuarine habitat is generally associated with moderate seasonal fluctuations in dissolved oxygen, pH, and temperature and with a wide range in turbidity.

(FRSH) FRESHWATER REPLENISHMENT

Uses of water for natural or artificial maintenance of surface water quantity or quality.

(GWR) GROUNDWATER RECHARGE

Uses of water for natural or artificial recharge of groundwater for purposes of future extraction, maintenance of water quality, or halting saltwater intrusion into freshwater aquifers.

The requirements for groundwater recharge operations generally reflect the future use to be made of the water stored underground. In some cases, recharge operations may be conducted to prevent seawater intrusion. In these cases, the quality of recharged waters may not directly affect quality at the wellfield being protected. Recharge operations are often limited by excessive suspended sediment or turbidity that can clog the surface of recharge pits, basins, or wells.

Under the state Antidegradation Policy, the quality of some of the waters of the state is higher than established by adopted policies. It is the intent of this policy to maintain that existing higher quality to the maximum extent possible.

Requirements for groundwater recharge, therefore, shall impose the Best Available Technology (BAT) or Best Management Practices (BMPs) for control of the discharge as necessary to assure the highest quality consistent with maximum benefit to the people of the state. Additionally, it must be recognized that groundwater recharge occurs naturally in many areas from streams and reservoirs. This recharge may have little impact on the quality of groundwaters under normal circumstances, but it may act to transport pollutants from the recharging water body to the groundwater. Therefore, groundwater recharge must be considered when requirements are established.

(IND) INDUSTRIAL SERVICE SUPPLY

Uses of water for industrial activities that do not depend primarily on water quality, including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, and oil well repressurization.

Most industrial service supplies have essentially no water quality limitations except for gross constraints, such as freedom from unusual debris.

(MAR) MARINE HABITAT

Uses of water that support marine ecosystems, including, but not limited to, preservation or enhancement of marine habitats, vegetation such as kelp, fish, shellfish, or wildlife (e.g., marine mammals, shorebirds).

In many cases, the protection of marine habitat will be accomplished by measures that protect wildlife habitat generally, but more stringent criteria may be necessary for waterfowl marshes and other habitats, such as those for shellfish and marine fishes. Some marine habitats, such as important intertidal zones and kelp beds, may require special protection.

(MIGR) FISH MIGRATION

Uses of water that support habitats necessary for migration, acclimatization between fresh water and salt water, and protection of aquatic organisms that are temporary inhabitants of waters within the region.

The water quality provisions acceptable to cold water fish generally protect anadromous

fish as well. However, particular attention must be paid to maintaining zones of passage. Any barrier to migration or free movement of migratory fish is harmful. Natural tidal movement in estuaries and unimpeded river flows are necessary to sustain migratory fish and their offspring. A water quality barrier, whether thermal, physical, or chemical, can destroy the integrity of the migration route and lead to the rapid decline of dependent fisheries.

Water quality may vary through a zone of passage as a result of natural or human-induced activities. Fresh water entering estuaries may float on the surface of the denser salt water or hug one shore as a result of density differences related to water temperature, salinity, or suspended matter.

(MUN) MUNICIPAL AND DOMESTIC SUPPLY

Uses of water for community, military, or individual water supply systems, including, but not limited to, drinking water supply.

The principal issues involving municipal water supply quality are (1) protection of public health; (2) aesthetic acceptability of the water; and (3) the economic impacts associated with treatment- or quality-related damages.

The health aspects broadly relate to: direct disease transmission, such as the possibility of contracting typhoid fever or cholera from contaminated water; toxic effects, such as links between nitrate and methemoglobinemia (blue babies); and increased susceptibility to disease, such as links between halogenated organic compounds and cancer.

Aesthetic acceptance varies widely depending on the nature of the supply source to which people have become accustomed. However, the parameters of general concern are excessive hardness, unpleasant odor or taste, turbidity, and color. In each case, treatment can improve acceptability although its cost may not be economically justified when alternative water supply sources of suitable quality are available.

Published water quality objectives give limits for known health-related constituents and most properties affecting public acceptance. These objectives for drinking water include the U.S. Environmental Protection Agency Drinking Water Standards and the California State Department of Health Services criteria.

(NAV) NAVIGATION

Uses of water for shipping, travel, or other transportation by private, military, or commercial vessels.

(PRO) INDUSTRIAL PROCESS SUPPLY

Uses of water for industrial activities that depend primarily on water quality.

Water quality requirements differ widely for the many industrial processes in use today. So many specific industrial processes exist with differing water quality requirements that no meaningful criteria can be established generally for quality of raw water supplies. Fortunately, this is not a serious shortcoming, since current water treatment technology can create desired product waters tailored for specific uses.

(RARE) PRESERVATION OF RARE AND ENDANGERED SPECIES

Uses of waters that support habitats necessary for the survival and successful maintenance of plant or animal species established under state and/or federal law as rare, threatened, or endangered.

The water quality criteria to be achieved that would encourage development and protection of rare and endangered species should be the same as those for protection of fish and wildlife habitats generally. However, where rare or endangered species exist, special control requirements may be necessary to assure attainment and maintenance of particular quality criteria, which may vary slightly with the environmental needs of each particular species. Criteria for species using areas of special biological significance should likewise be derived from the general criteria for the habitat types involved, with special management diligence given where required.

(REC1) WATER CONTACT RECREATION

Uses of water for recreational activities involving body contact with water where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, whitewater activities, fishing, and uses of natural hot springs.

Water contact implies a risk of waterborne disease transmission and involves human health; accordingly, criteria required to protect this use are more stringent than those for more casual water-oriented recreation.

Excessive algal growth has reduced the value of shoreline recreation areas in some cases, particularly for swimming. Where algal growths exist in nuisance proportions, particularly bluegreen algae, all recreational water uses, including fishing, tend to suffer.

One criterion to protect the aesthetic quality of waters used for recreation from excessive algal growth is based on chlorophyll a.

(REC2) NONCONTACT WATER RECREATION

Uses of water for recreational activities involving proximity to water, but not normally involving contact with water where water ingestion is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tide pool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.

Water quality considerations relevant to noncontact water recreation, such as hiking, camping, or boating, and those activities related to tide pool or other nature studies require protection of habitats and aesthetic features. In some cases, preservation of a natural wilderness condition is justified, particularly when nature study is a major dedicated use.

One criterion to protect the aesthetic quality of waters used for recreation from excessive algal growth is based on chlorophyll a.

(SHELL) SHELLFISH HARVESTING

Uses of water that support habitats suitable for the collection of crustaceans and filter-feeding shellfish (e.g., clams, oysters, and mussels) for human consumption, commercial, or sport purposes.

Shellfish harvesting areas require protection and management to preserve the resource and protect public health. The potential for disease transmission and direct poisoning of humans is of considerable concern in shellfish regulation. The bacteriological criteria for the open ocean, bays, and estuarine waters where shellfish cultivation and harvesting occur should conform with the standards described in the National Shellfish Sanitation Program, Manual of Operation.

Toxic metals can accumulate in shellfish. Mercury and cadmium are two metals known to have caused extremely disabling effects in humans who consumed shellfish that concentrated these elements from industrial waste discharges. Other elements, radioactive isotopes, and certain toxins produced by particular plankton species also concentrate in shellfish tissue. Documented cases of paralytic shellfish poisoning are not uncommon in California.

(SPWN) FISH SPAWNING

Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.

Dissolved oxygen levels in spawning areas should ideally approach saturation levels. Free movement of water is essential to maintain well-oxygenated conditions around eggs deposited in sediments. Water temperature, size distribution and organic content of sediments, water depth, and current velocity are also important determinants of spawning area adequacy.

(WARM) WARM FRESHWATER HABITAT

Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

The warm freshwater habitats supporting bass, bluegill, perch, and other panfish are generally lakes and reservoirs, although some minor streams will serve this purpose where stream flow is sufficient to sustain the fishery. The habitat is also important to a variety of nonfish species, such as frogs, crayfish, and insects, which provide food for fish and small mammals. This habitat is less sensitive to environmental changes, but more diverse than the cold freshwater habitat, and natural fluctuations in temperature, dissolved oxygen, pH, and turbidity are usually greater.

(WILD) WILDLIFE HABITAT

Uses of waters that support wildlife habitats, including, but not limited to, the preservation and enhancement of vegetation and prey species used by wildlife, such as waterfowl.

The two most important types of wildlife habitat are riparian and wetland habitats. These habitats can be threatened by development, erosion, and sedimentation, as well as by poor water quality.

The water quality requirements of wildlife pertain to the water directly ingested, the aquatic habitat itself, and the effect of water quality on the production of food materials. Waterfowl habitat is particularly sensitive to changes in water quality. Dissolved oxygen, pH, alkalinity, salinity, turbidity, settleable

matter, oil, toxicants, and specific disease organisms are water quality characteristics particularly important to waterfowl habitat.

Dissolved oxygen is needed in waterfowl habitats to suppress development of botulism organisms; botulism has killed millions of waterfowl. It is particularly important to maintain adequate circulation and aerobic conditions in shallow fringe areas of ponds or reservoirs where botulism has caused problems.

PRESENT AND POTENTIAL BENEFICIAL USES

SURFACE WATERS

Surface waters in the region consist of freshwater rivers, streams, and lakes (collectively described as inland surface waters), estuarine waters, and coastal waters. Estuarine waters are comprised of the Bay system from the Golden Gate to the regional boundary near Pittsburg and the lower portions of streams flowing into the Bay, such as the Napa and Petaluma rivers in the north and Coyote and San Francisquito creeks in the south.

Inland surface waters support or could support most of the beneficial uses described above. The specific beneficial uses for inland streams include municipal and domestic supply, agricultural supply, industrial process supply, groundwater recharge, water contact recreation, noncontact water recreation, wildlife habitat, cold freshwater habitat, warm freshwater habitat, fish migration, and fish spawning. The San Francisco Bay Estuary supports estuarine habitat, industrial service supply, and navigation in addition to all of the uses supported by streams.

Coastal waters' beneficial uses include water contact recreation; noncontact water recreation; industrial service supply; navigation; marine habitat; shellfish harvesting; ocean, commercial and sport fishing; and preservation of rare and endangered species. In addition, the California coastline within the San Francisco Bay Basin is endowed with exceptional scenic beauty.

Beneficial uses of each significant water body have been identified and are organized according to the seven major watersheds within the region (Figure 2-2). The maps locating each water body (Figures 2-3 through 2-9) and tables keyed to each map (Tables 2-1 through 2-7) describing associated present and potential beneficial uses were produced using a geographical information system (GIS) at the Regional Board. More detailed representations of each location can be created using this computerized version.

The beneficial uses of any specifically identified water body generally apply to all its tributaries. In some cases a beneficial use may not be applicable to the entire body of water, such as navigation in Calabazas Creek or shellfish harvesting in the Pacific Ocean. In these cases, the Regional Board's judgment regarding water quality control measures necessary to protect beneficial uses will be applied.

GROUNDWATERS

Groundwater is defined as subsurface water that occurs beneath the water table in soils and geologic formations that are fully saturated. Where groundwater occurs in a saturated geologic unit that contains sufficient permeable thickness to yield significant quantities of water to wells and springs, it can be defined as an aquifer. A groundwater basin is defined as a hydrogeologic unit containing one large aquifer or several connected and interrelated aquifers.

Water-bearing geologic units occur within groundwater basins in the region that do not meet the definition of an aquifer. For instance, there are shallow, low permeability zones throughout the region that have extremely low water yields. Groundwater may also occur outside of currently identified basins. Therefore, for basin planning purposes, the term "groundwater" includes all subsurface waters, whether or not these waters meet the classic definition of an aquifer or occur within identified groundwater basins.

The areal extent of groundwater basins in the region has been evaluated by the Department of Water Resources (DWR) (Bulletin 118, 1980). Of special importance to the region are the 31 groundwater basins classified by DWR that produce, or potentially could produce, significant amounts of groundwater. Table 2-8 summarizes the hydrogeologic characteristics of basins depicted in Figure 2-10. This computer groundwater mapping GIS system was developed by the Regional Board and has the capacity to present information on each basin at a much higher level of resolution.

Existing and potential beneficial uses applicable to groundwater in the region include municipal and domestic water supply (MUN), industrial water supply (IND), industrial process water supply (PROC), agricultural water supply (AGR), and freshwater replenishment to surface waters (FRESH). Table 2-9 lists the 31 identified groundwater basins located in the region and their existing and potential beneficial uses.

Unless otherwise designated by the Regional Board, all groundwaters are considered

suitable, or potentially suitable, for municipal or domestic water supply (MUN). In making any exceptions, the Regional Board will consider the criteria referenced in Regional Board Resolution No. 89-39, "Sources of Drinking Water," where:

- The total dissolved solids exceed 3,000 mg/l (5,000 µS/cm, electrical conductivity), and it is not reasonably expected by the Regional Board that the groundwater could supply a public water system; or
- There is contamination, either by natural processes or by human activity (unrelated to a specific pollution incident), that cannot reasonably be treated for domestic use using either Best Management Practices or best economically achievable treatment practices; or
- The water source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day; or
- The aquifer is regulated as a geothermal energy-producing source or has been exempted administratively pursuant to 40 CFR Part 146.4 (revised April 1, 1983) for the purpose of underground injection of fluids associated with the production of hydrocarbon or geothermal energy, provided that these fluids do not constitute a hazardous waste under 40 CFR Part 261.3 (revised October 30, 1992).

WETLANDS

Federal administrative law (e.g., 40 CFR Part 122.2, revised December 22, 1993) defines wetlands as waters of the United States. National waters include waters of the State of California, defined by the Porter-Cologne Act as "any water, surface or underground, including saline waters, within the boundaries of the State." (CWC §13050[e]). Wetlands water quality control is therefore clearly within the jurisdiction of the State and Regional Boards.

Wetlands are further defined in 40 CFR 122.2 as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."

The Regional Board recognizes that wetlands frequently include areas commonly referred to as saltwater marshes, freshwater marshes, open or closed brackish water marshes, mudflats, sandflats, unvegetated seasonally ponded areas, vegetated shallows, sloughs, wet meadows, playa lakes, natural ponds, vernal pools, diked baylands, seasonal wetlands, and riparian woodlands.

Mudflats make up one of the largest and most important habitat types in the San Francisco Estuary. Snails, clams, worms, and other animals convert the rich organic matter in the mud bottom to food for fish, crabs, and birds. Mudflats generally support a variety of edible shellfish, and many species of fish rely heavily on the mudflats during at least a part of their life cycle. Additionally, San Francisco Bay mudflats are one of the most important habitats on the coast of California for millions of migrating shorebirds.

Another important characteristic of the San Francisco Estuary is the fresh, brackish, and salt water marshes around the Bay's margins. These highly complex communities are recognized as vital components of the Bay system's ecology. Most marshes around the Bay have been destroyed through filling and development. The protection, preservation, and restoration of the remaining marsh communities are essential for maintaining the ecological integrity of the San Francisco Estuary.

Identifying wetlands may be complicated by such factors as the seasonality of rainfall in the region. Therefore, in identifying wetlands, the Regional Board will consider such indicators as hydrology, hydrophytic plants, and/or hydric soils. The Regional Board will, in general, rely on the federal manual for wetlands delineation in this region for Section 404 permits (*Federal Manual for Identifying and Delineating Jurisdictional Wetlands*, 1989; U.S. Army Corps of Engineers, U.S. EPA, U.S. Fish and Wildlife Service, and U.S. Soil Conservation Service, Washington, D.C., Cooperative Technical Publication). In the rare cases where the U.S. EPA and Corps guidelines disagree, the Regional Board will rely on the wetlands delineation made by U.S. EPA or the California Department of Fish and Game.

There are many potential beneficial uses of wetlands, including Wildlife Habitat; Preservation of Rare and Endangered Species; Shellfish Harvesting; Water Contact Recreation; Noncontact Water Recreation; Ocean, Commercial, and Sport Fishing; Marine Habitat; Fish Migration; Fish Spawning; and Estuarine Habitat. Table 2-10 lists and specifies beneficial uses for 34 significant wetland areas within the region; generalized locations of these wetlands are shown in Figure 2-11.

It should be noted that most of the wetlands listed in Table 2-10 are saltwater marshes, and that the list is not comprehensive. The Regional Board is facilitating the preparation of a Regional Wetlands Management Plan (RWMP) that will identify and specify beneficial uses of many additional significant wetlands. Because of the large number of small and non-contiguous wetlands, it will probably not be practical to delineate and specify beneficial uses of every wetland area. Therefore, beneficial uses may be determined site specifically, as needed. Chapter 4 of this Plan contains additional information on the RWMP and on the process used to determine beneficial uses for specific wetland sites.

TABLE 2-8 GROUNDWATER BASIN CHARACTERISTICS (1)

GROUNDWATER BASIN	COUNTY	DWR BASIN NO.(2)	AREAL EXTENT (SQ. MI.)	DEPTH ZONE (FEET) (3)	STORAGE CAPACITY (4)	PERENNIAL YIELD (5)
Alameda Creek (Niles Cone)	Alameda	2 - 9.01	97.0	40 - >500[a]	1.3 mil[a]	32,600[a]
Castro Valley	Alameda	2 - 8	4.0	NA	NA	NA
East Bay Plain	Alameda	2 - 9.01	114.0	25 - 596[b]	2.77 mil[c]	NA
Livermore Valley	Alameda	2 - 10	170.0	0 - 500[d]	540,000[d]	13,500[e]
Sunol Valley	Alameda	2 - 11	28.0	160 - 500[f]	>2,800[g] ?	140[g] ?
Arroyo Del Hambre Valley	Contra Costa	2 - 31	2.0	NA	NA	NA
Clayton Valley	Contra Costa	2 - 5	30.0	50 - 300[h]	180,000[d] ?	NA
Pittsburg Plain	Contra Costa	2 - 4	30.0	50 - 160[h]	NA	NA
San Ramon Valley	Contra Costa	2 - 7	30.0	300 - 600[i]	NA	NA
Ygnacio Valley	Contra Costa	2 - 6	30.0	20 - 300[h]	50,000[h]	NA
Novato Valley	Marin	2 - 30	17.5	55 - 90[j]	NA	NA
Sand Point Area	Marin	2 - 27	2.0	20 - 300[k]	NA	NA
San Rafael	Marin	2 - 29	NA	NA	NA	NA
Ross Valley	Marin	2 - 28	18.0	10 - 60[l]	1380[l]	350[l]
Napa Valley	Napa	2 - 2 & 2 - 2.01	210.0	50 - 500[m]	240,000[n]	24,000[m]
Islais Valley	San Francisco	2 - 33	NA	NA	NA	NA
Merced Valley (North)	San Francisco	2 - 35	16.0	NA	NA	NA
San Francisco Sands	San Francisco	2 - 34	14.0	NA	NA	NA
Visitation Valley	San Francisco	2 - 32	7.5	NA	NA	NA
Half Moon Bay Terrace	San Mateo	2 - 22	25.0	20 - 15[o]	10,300[o]	2,200[o]
Merced Valley (South)	San Mateo	2 - 35A	16.0	250 - 745[p]	NA	NA
Pescadero Valley	San Mateo	2 - 26	2.0	NA	NA	NA
San Gregorio Valley	San Mateo	2 - 24	2.0	NA	NA	NA
San Mateo Plain	San Mateo	2 - 9A	32.5	100 - 500[q]	NA	NA
San Pedro Valley	San Mateo	2 - 36	2.0	NA	NA	NA
Santa Clara Valley (& Coyote)	Santa Clara	2 - 9B	240.0	10 - 1010[d]	3.0 mil[r]	100,000[r]
Suisun/Fairfield Valley	Solano	2 - 3	203.0	30 - 400[s,t]	40,000[t]	NA
Kenwood Valley	Sonoma	2 - 19	6.0	0 - 1000[d]	460,000[d]	NA
Petaluma Valley	Sonoma/Mrn.	2 - 1	41.0	0 - 900[d]	2.1 mil[d]	NA
Sebastopol-Merced Fm. Highlands	Sonoma	2 - 25	150.0	NA	NA	NA
Sonoma Valley	Sonoma	2 - 2.022	50.0	0 - 1000[d]	2.66 mil[d]	NA

NA - Not Available.

NOTES:

(1) Information compiled from DWR and local water management agencies. (References are listed below.)
(2) DWR Bulletin 118-80 (1980).
(3) Average depth to aquifers below land surface. These depths are provided for information only and cannot be used to characterize site-specific conditions.
(4) Total available storage in acre-feet. (References are listed below.)
(5) The average annual amount of groundwater that can be withdrawn without producing an undesired result. (References are listed below.)

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TABLE 2-9 EXISTING AND POTENTIAL BENEFICIAL USES OF GROUNDWATER IN IDENTIFIED BASINS

GROUNDWATER BASIN	COUNTY	DWR BASIN NO.	MUN[1]	PROC[2]	IND[3]	AGR[4]	FRESH[5]
Alameda Creek (Niles Cone)	Alameda	2 - 9.01	E[6]	E	E	E	
Castro Valley	Alameda	2 - 8	P[7]	P	P	P	
East Bay Plain	Alameda	2 - 9.01	E	E	E	E	
Livermore Valley	Alameda	2 - 10	E	E	E	E	
Sunol Valley	Alameda	2 - 11	E	E	E	E	
Arroyo Del Hambre Valley	Contra Costa	2 - 31	P	P	P	P	
Clayton Valley	Contra Costa	2 - 5	E	P	P	P	
Pittsburg Plain	Contra Costa	2 - 4	P	P	P	P	
San Ramon Valley	Contra Costa	2 - 7	E	P	P	E	
Ygnacio Valley	Contra Costa	2 - 6	P	P	P	P	
Novato Valley	Marin	2 - 30	P	P	P	P	
Sand Point Area	Marin	2 - 27	E	P	P	P	
San Rafael	Marin	2 - 29	P	P	P	P	
Ross Valley	Marin	2 - 28	E	P	P	E	
Napa Valley	Napa	2.2 & 2 - 2.01	E	E	E	E	
Islais Valley	San Francisco	2 - 33	P	E	E	P	
Merced Valley (North)	San Francisco	2 - 35	P	P	P	E	
San Francisco Sands	San Francisco	2 - 34	E	P	P	E	
Visitation Valley	San Francisco	2 - 32	P	E	E	P	
Half Moon Bay Terrace	San Mateo	2 - 22	E	P	P	E	
Merced Valley (South)	San Mateo	2 - 35A	E	P	P	E	
Pescadero Valley	San Mateo	2 - 26	E	P	P	E	
San Gregorio Valley	San Mateo	2 - 24	E	P	P	E	
San Mateo Plain	San Mateo	2 - 9A	E	E	E	P	
San Pedro Valley	San Mateo	2 - 36	P	P	P	P	
Santa Clara Valley (& Coyote)	Santa Clara	2 - 9B	E	E	E	E	
Suisun/Fairfield Valley	Solano	2 - 3	E	E	E	E	
Kenwood Valley	Sonoma	2 - 19	E	P	P	E	
Petaluma Valley	Sonoma	2 - 1	E	P	P	E	
Sebastopol-Merced Fm. Highlands	Sonoma	2 - 25	E	P	P	E	
Sonoma Valley	Sonoma	2 - 2.022	E	P	P	E	

NOTES:
(1) MUN = Municipal and domestic water supply.
(2) PROC = Industrial process water supply.
(3) IND = Industrial service water supply.
(4) AGR = Agricultural water supply.
(5) FRESH = Freshwater replenishment to surface water. (Designation will be determined at a later date; for the interim, a site-by-site determination will be made).
(6) E = Existing beneficial use; based on available information (see references listed in Table 2-8).
(7) P = Potential beneficial use; based on available information. There is no known use of the basin for this category; however, the basin could be used for this purpose (see references listed in Table 2-8).

TABLE 2-10 BENEFICIAL USES OF WETLAND AREAS[a]

BASIN/MARSH AREA	WETLAND TYPES		BENEFICIAL USES									
	FRESH	BRACKISH	EST	MAR	MIGR	COMM	RARE	REC 1	REC 2	SALT	SPWN	WILD
ALAMEDA COUNTY												
Arrowhead			●				●	●	●	●	●	●
Coyote Hills			●				●	●	●	●	●	●
Emeryville Crescent			●				●	●	●	●	●	●
Hayward			●					●	●	●	●	●
CONTRA COSTA COUNTY												
North Contra Costa		●	●				●	●	●	●	●	●
Point Edith		●	●				●		●		●	●
San Pablo Creek			●				●	●	●	●	●	●
Wildcat Creek			●				●	●	●		●	●
MARIN COUNTY												
Abbotts Lagoon				●				●	●	●		●
Bolinas Lagoon				●				●	●	●		●
Corte Madera			●				●	●	●	●	●	●
Drakes Estero								●	●	●	●	●
Gallinas Creek		●	●				●	●	●	●	●	●
Limantour Estero				●				●	●	●		●
Corte Madera Ecological Reserve			●					●	●	●		●
Novato Creek		●	●		●		●	●	●	●	●	
Richardson Bay			●				●	●	●	●	●	●
Rodeo Lagoon				●				●	●	●		●
San Pedro		●	●			●	●		●	●	●	●
San Rafael Creek		●	●				●	●	●	●		●
Tomales Bay				●	●			●	●	●	●	●
NAPA COUNTY												
Mare Island			●						●	●		●
Napa		●	●		●	●	●	●	●		●	
San Pablo Bay			●		●	●	●	●	●	●	●	●
SAN MATEO COUNTY												
Bair Island			●				●	●	●	●		●
Belmont Slough			●				●	●	●	●	●	●
Pescadero	●			●	●		●	●	●	●	●	●
Princeton		●						●	●	●		●
Redwood City Area			●				●	●	●			●
SANTA CLARA COUNTY												
South San Francisco Bay			●		●	●	●	●	●	●	●	●
SOLANO COUNTY												
Southhampton Bay			●				●	●	●	●	●	●
Suisun	●	●	●		●		●	●	●		●	●
White Slough			●		●		●	●	●	●	●	●
SONOMA COUNTY												
Petaluma		●	●		●	●	●	●	●		●	●

NOTE:
a. General locations of wetlands areas are depicted in Figure 2-11.